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## UPRAVLJANJE KVALITETOM U OBALNOM LINIJSKOM KONTEJNERSKOM BRODARSTVU S ASPEKTA UPRAVLJANJA TROŠKOVIMA

### *QUALITY MANAGEMENT IN COASTAL CONTAINER LINER SHIPPING FROM THE POINT OF VIEW OF COST MANAGEMENT*

#### SAŽETAK

*S ciljem poboljšanja upravljanja kvalitetom i sigurnošću u pomorskom prometu međunarodne pomorske organizacije propisale su i uvele mnoga pravila i standarde. U posljednje vrijeme ta pravila i standardi dodatno su se postrožili sa svrhom uklanjanja podstandardnih brodova i brodara iz pomorstva. Primjena tih novih pravila i standarda upravljanja sigurnošću i kvalitetom na brodovima iziskuje od brodara povećane troškove. Troškovi upravljanja kvalitetom imaju sve značajniji udio u troškovima poslovanja brodara. Iz tog razloga uobičajenoj podjeli troškova broda na fiksne i komercijalne troškove te troškove goriva i maziva potrebno je dodati i troškove upravljanja kvalitetom. Zahvaljujući takvoj podjeli troškova, brodaru je omogućeno preciznije upravljanje troškovima poslovanja te planiranje poslovnih odluka.*

**Ključne riječi:** kvaliteta, upravljanje kvalitetom, upravljanje troškovima, obalno linijsko kontejnersko brodarstvo

#### SUMMARY

*In order to improve quality and safety management in maritime transport the International Maritime Organization has brought in a large number of regulations and standards. Those rules and standards have lately become stricter in order to remove sub-standard vessels and shipping operators from the market. Application of the new regulations and standards regarding quality and safety management on board a vessel has incurred additional costs on shipping operators. Quality management costs are an increasingly important part of a shipping operator's business costs. For that reason the common division of vessel costs into fixed costs, commercial costs and fuelling costs should be added quality management costs. Thanks to such a division of costs shipping operators can have more efficient business cost management and more accurate business plans.*

**Key words:** Quality, quality management, cost management, coastal container liner shipping

## 1. UVOD

Upravljanje troškovima (*cost management*) poseban je način upravljanja poduzećem i vođenja poslovanja koji najveću važnost u postizanju organizacijskih ciljeva poklanja kontroli troškova. Za tu svrhu razvijene su metode i postupci, odnosno brojni modeli koji upravlja organizacije osiguravaju potrebnu količinu informacija neophodnih za donošenje odluka u cilju optimizacije troškova na temelju činjenica.

Poslovanje linijskog kontejnerskog brodararstva u pravilu je uhodan posao koji jednom uspostavljenu liniju održava duže vrijeme sa stalnim brojem luka ticanja te ustaljenom i poznatom veličinom troškova koji nastaju tijekom putovanja.

Troškovi kvalitete ( $C_Q$ ) jesu dodatni, odnosno novi izdaci brodararstva koji nastaju u procesu proizvodnje usluge s ciljem dobivanja postavljenih standarda. Trošak kvalitete kao dodatni trošak sastavni je dio ukupnog troška proizvodnje pomorske usluge i svojom veličinom neposredno utječe na veličinu ukupnog troška putovanja ( $C_{PUT}$ ). Valja naglasiti da kvaliteta "ima vrijednost", odnosno da upravljanje kvalitetom predstavlja trošak.

Dosadašnjoj podjeli troškova putovanja brodararstva na fiksne i komercijalne troškove te troškove goriva i maziva potrebno je dodati i troškove upravljanja kvalitetom. Na taj način dobiva se realniji prikaz i vrijednost troškova brodararstva na putovanju kao i udio koji pojedini troškovi imaju u ukupnim troškovima putovanja.

Poznavanje vrijednosti troškova brodararstva na putovanju te strukture tih troškova temeljna je pretpostavka za uspostavljanje sustava upravljanja tim troškovima.

## 2. TROŠKOVI U SUSTAVU OLKB-a

Obalno linijsko kontejnersko brodararstvo (OLKB) definira se kao sustav razvoza kontejnera sa sabirnih terminala do luka ili terminala njihovog odredišta (ili mjesta gdje će biti predana drugom obliku intermodalnog transporta) te njihov prijevoz od sporednog terminala (krajnje točke cestovnog ili željezničkog transporta) do sabirnih terminala.

Kretanje veličine troška u linijskom brodararstvu u pravilu se promatra na razini jednog završenog putovanja. Putovanje (PUT) jest te-

## 1. INTRODUCTION

Cost management is the control and organizing of a business which pays special attention to cost control in achieving its business goals. Special methods and procedures have been devised as well as numerous models to provide the necessary amount of information required for making decisions in order to optimize the costs based on facts.

Coastal container liner shipping is a well-established business with a permanent number of ports of call and well-established and familiar amount of costs which arise on a voyage.

Quality costs ( $C_Q$ ) are additional or new costs incurred on the operator in the course of performing business operations in order to meet set standards and requirements. Quality costs increase the total voyage costs ( $C_{PUT}$ ). It is important to point out that quality 'has a value' i.e. quality management incurs additional costs.

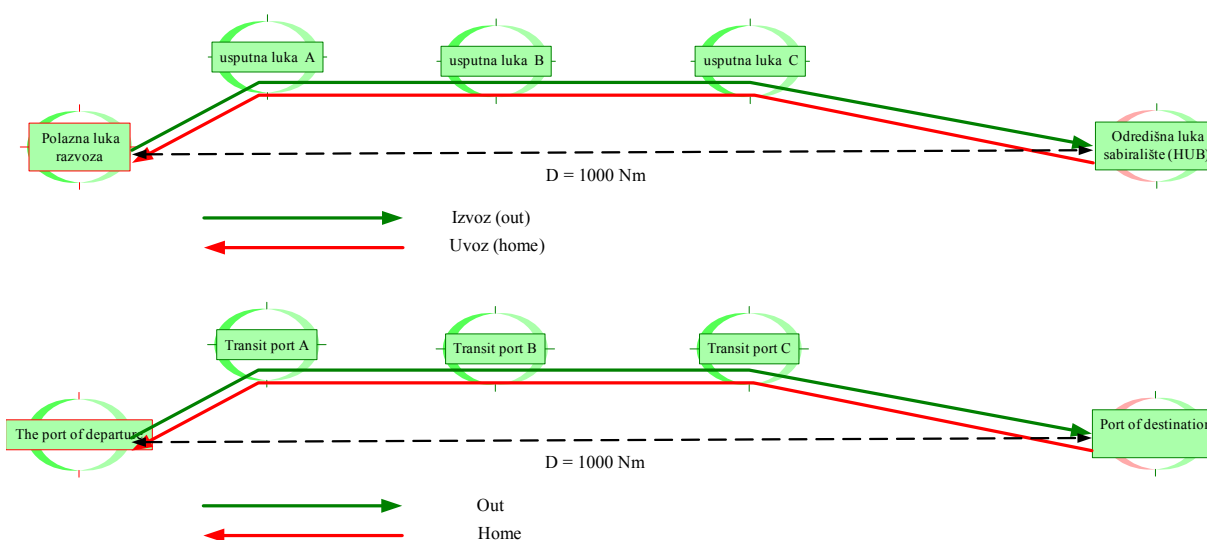
The current division of voyage costs into fixed costs, commercial costs and fuelling and lubricants costs should also include quality management costs. In that way a more accurate view of a journey costs is given and it is clearly seen what is the proportion of each type of costs in the total voyage costs.

In order to establish a good cost management system it is essential to know the amount of each type of costs of a voyage.

## 2. COSTS IN COASTAL CONTAINER LINER SHIPPING

Coastal container liner shipping (CCLS) is defined as a system in which containers are transported from HUB terminals to small ports or terminals (or places where they will be handed to other means of intermodal transport) as well as from small ports or terminals (endpoints of road or railway transport) to the HUB terminals.

The amount of costs that is taken into consideration in coastal container liner shipping is the amount of costs that arises from one completed voyage. A voyage (PUT) is a basic unit according to which the operator monitors the business performance. Each voyage is assigned a serial number. A voyage duration is expressed in days.



Slika 1. Putovanje linijskog kontejnerskog broda  
 Figure 1. A voyage of a vessel in coastal container liner shipping

Izvor: Autor  
 Source: Author

meljna veličina na kojoj brodar zasniva praćenje uspješnosti poslovanja. Na početku godine evidentira se rednim brojem, dok se trajanje putovanja izražava u danima.

Ukupno trajanje putovanja ( $T_{PUT}$ ) predstavlja mjernu jedinicu koja se izražava u danima, a sastoji se od ukrcaja u luci ishodišta ( $P_1$ ), vremena u plovidbi ( $t_s$ ), nakon kojeg se taj teret iskrcava u luci odredišta ( $P_x$ ) i ukrca povratni teret, te završava iskrcavanjem posljednje jedinice tereta nakon povratka u luku ishodišta.

Putovanje je složena veličina i sastoji se od boravka u luci ishodišta, plovidbe, ticanja eventualnih usputnih luka ( $P_2, P_3, \dots, P_n$ ), dolaska u luku odredišta te povratka.

$$T_{PUT} = T_s + T_p \text{ [dan]}, \quad (1)$$

gdje je:

$T_s$  – vrijeme broda provedeno u plovidbi<sup>1</sup>

$T_p$  – vrijeme broda provedeno u luci.

Uobičajena podjela troškova u obalnom linijskom brodarstvu jest sljedeća:

- fiksni troškovi ( $C_F$ ),
- komercijalni troškovi ( $COM_C$ ) i

<sup>1</sup> Vrijeme provedeno u plovidbi uključuje i vrijeme koje je brod proveo na sidrištu te vrijeme potrebno za uplovljenje i isplavljenje broda.

The total voyage duration ( $T_{PUT}$ ) is a unit expressed in days. It begins with loading of the cargo in the port of departure ( $P_1$ ), includes the time underway ( $t_s$ ), unloading of the cargo in the port of unloading ( $P_x$ ) and loading of new cargo for the way back, and it ends with unloading of the last unit of cargo after returning back to the port of departure.

A voyage is a complex unit which consists of the time spent in the port of departure, the time underway, the time spent in ports of call ( $P_2, P_3, \dots, P_n$ ), the arrival to the port of destination and the way back.

$$T_{PUT} = T_s + T_p \text{ [day]}, \quad (1)$$

where:

$T_s$  – the time underway,<sup>1</sup>

$T_p$  – the time spent in port

The common division of costs in coastal container liner shipping is the following:

- Fixed costs ( $C_F$ ),
- Commercial costs ( $COM_C$ ) and
- Fuelling costs ( $C_G$ )

The amount of costs is always expressed in monetary units.

<sup>1</sup> The time underway also includes the time spent at anchor as well as the time needed for arrival at a port and sailing out.

– troškova goriva ( $C_G$ ).

Vrijednost troškova uvijek se izražava u novčanim jedinicama.

Ukupni trošak ( $C_{PUT}$ ) ostvaren na putovanju definira se kao zbroj gore navedenih troškova jednog putovanja izražen u novčanim jedinicama.

$$C_{PUT} = C_F + COM_C + C_G \text{ [novčane jed.],} \quad (2)$$

gdje je:

$C_{PUT}$  – trošak putovanja

$C_F$  – fiksni trošak broda

$C_G$  – trošak goriva i maziva.

### Fiksni troškovi

Fiksni troškovi (*fixed costs*,  $C_F$ ) jesu troškovi čija ukupna visina u određenom razdoblju ostaje nepromijenjena neovisno o promjenama stupnja aktivnosti poduzeća. Fiksni troškovi jesu svi oni troškovi koje ima OLKB bez obzira obavlja li prijevoznu uslugu ili ne. U brodarstvu je uobičajeno da se svi troškovi svode na jedinicu prijevoza, odnosno na brod. Fiksni trošak često je i planska veličina<sup>2</sup> koja se u pravilu određuje na godišnjoj razini.

Uobičajene stavke koje čine ukupni fiksni trošak jesu pojedinačni fiksni troškovi ( $c_{Fj}$ ): (1) trošak održavanja i popravaka, (2) trošak rezervnih dijelova, (3) troškovi popravaka, (4) trošak zaposlenih, (5) troškovi uprave, (6) troškovi amortizacije, (7) troškovi osiguranja, (8) troškovi kapitala (kamate i bankovni troškovi) .... (n) drugi fiksni troškovi

$$C_F = \sum_{j=1}^n c_{Fj} \quad (3)$$

- Troškovi održavanja – uključuju cijenu rada održavanja i troškove ugrađenih dijelova, a ovise o tome plovi li brod i u kojim područjima plovi, koji teret prevozi itd. Uključuju također i trošak koji nastaje zbog zastoja radi ugradnje rezervnih dijelova.
- Troškovi potrošnih materijala – inventarski predmeti, boje, kemikalije, plinovi, maziva,

<sup>2</sup> Fiksni trošak uvijek se određuje za naredno razdoblje na temelju procjene. Za dobru procjenu fiksnog troška potrebno je detaljno znanje o svim segmentima troškova. Nerealne procjene fiksnog troška mogu uvelike ugroziti poslovanje brodarstva.

$$C_{PUT} = C_F + COM_C + C_G \text{ [monetary units],} \quad (2)$$

Where:

$C_{PUT}$  – voyage costs,

$C_F$  – fixed costs of a vessel,

$C_G$  – fuelling and lubricants costs

### Fixed Costs

Fixed costs, ( $C_F$ ) are the costs the total amount of which remains unchanged over a particular period of time regardless of the change in the degree of business activity. Fixed costs include all the costs of Coastal Container Liner Shipping which are incurred regardless of whether the transport services are being performed or not. It is common practice in shipping to measure all the costs by a transport unit, i.e. by a vessel. Fixed costs can often be planned<sup>2</sup> and they are usually determined for the period of one year.

Total fixed costs usually consist of the following items ( $c_{Fj}$ ): (1) maintenance costs, (2) spare-part inventory costs, (3) repair costs, (4) crewing costs, (5) administrative costs, (6) depreciation costs, (7) insurance costs, (8) capital costs (interest and bank charges) .... (n) other fixed costs.

$$C_F = \sum_{j=1}^n c_{Fj} \quad (3)$$

- Maintenance costs – include the costs of maintenance work and the costs of installed spare parts. These costs depend on whether the vessel is underway or not and where, what cargo is being transported etc. They also include the costs incurred by a delay due to installation of spare parts.
- Spare-part inventory costs – inventory, paints, chemicals, gasses, lubricants... These costs depend on whether the vessel is underway or not and where, what cargo is being transported etc.
- crewing costs (victualling and travel expenses);

<sup>2</sup> Fixed costs are always estimated for the upcoming period. In order to make a good estimate of fixed costs it is necessary to be well acquainted with all the cost segments in detail. An unrealistic estimate of fixed costs may severely hamper business operations.

... Ovi troškovi ovise o tome plove li brod i u kojim područjima plove, koji teret prevozi itd.

- Osobni dohoci i ostali troškovi posade (prehrana i putni troškovi posade).
- Troškovi osiguranja rizika – troškovi osiguranja trupa, stroja, osiguranje prema trećima itd. Ovisi o vrijednosti, tipu broda, godištu gradnje itd.
- Opći troškovi i troškovi uprave – mogu se nazvati i troškovima administracije jer obuhvaćaju troškove “zastave”, PTT troškove, osobne dohotke i ostale troškove uprave.
- Amortizacija – postupno smanjivanje vrijednosti brodova. Povećava se s porastom vrijednosti broda.

### Komercijalni troškovi

Komercijalne troškove (*commercial costs*,  $COM_C$ ) čine troškovi prekrcanja i separacije tereta (npr. prema *International Maritime Dangerous Goods Code*), provizije posrednicima i agentima te lučki troškovi i troškovi prolaza kanala uključujući peljarenje i tegljenje. Brod boljih manevarskih sposobnosti i sposobnosti rukovanja teretom u pravilu može imati niže komercijalne troškove. Komercijalni troškovi jesu varijabilni troškovi.

Komercijalni trošak promjenjiva je veličina koja svoje vrijednosti poprima ovisno o trenutnom položaju broda na putovanju<sup>3</sup>. Komercijalni troškovi jesu troškovi koji su vezani za komercijalno iskorištavanje brodova. Uobičajene stavke koje čine komercijalni trošak jesu pojedinačni komercijalni troškovi ( $com_C$ ): (1) troškovi priveza broda, (2) troškovi upotrebe obale, (3) troškovi peljarenja, (4) troškovi tegljenja, (5) troškovi agenta, (6) troškovi svjetlarine, (7) troškovi osiguranja tereta, (8) troškovi naknade za sidrenje (k), te drugi komercijalni troškovi

$$COM_C = \sum_{j=1}^k com_{C_j}. \quad (4)$$

<sup>3</sup> Pod položajem broda na putovanju smatra se trenutni položaj broda u sustavu. Brod u sustavu može biti u plovidbi, na sidrištu, na ukrcaju i iskrcaju tereta, na mrtvom vezu itd.

- Risk insurance costs – **hull and machine insurance costs**, P&I insurance etc. These costs depend on the vessel type, the year of construction etc.
- General and administrative costs – these costs include ‘flag’ costs, postal costs, on-shore personnel wages and other administrative costs.
- Depreciation – gradual decrease in value of the vessel. It increases when the vessel value is increased.

### Commercial Costs

Commercial Costs ( $COM_C$ ) include the costs of cargo loading/unloading and cargo separation (for example according to *International Maritime Dangerous Goods Code*), broker and agent commission costs, port costs and channel passage costs including pilotage and towing. A vessel with better manoeuvring and cargo handling capacities may have lower commercial costs. Commercial costs are variable costs.

Commercial costs are a variable which acquires its value according to the current position of a vessel on a voyage<sup>3</sup>. Commercial costs are related to commercial exploitation of a vessel. Commercial costs usually consist of the following items ( $com_C$ ): (1) mooring costs, (2) key dues, (3) pilotage costs, (4) tug costs, (5) agent fees, (6) light dues, (7) cargo insurance costs, (8) anchorage dues (k) and other commercial costs.

$$COM_C = \sum_{j=1}^k com_{C_j}. \quad (4)$$

### Fuelling Costs

Fuelling Costs, ( $C_G$ ) – include supply of fuel and lubricants to the vessel necessary for the function of the main and auxiliary engines. These costs are a variable which acquires its value according to the current position of the vessel on a voyage. Fuelling costs usually consist of the following items ( $c_G$ ): (1) fuel costs (heavy fuel), (2) diesel fuel costs (light fuel),

<sup>3</sup> The current position of the vessel on a voyage means the current position of the vessel in the system. The vessel can be underway, at anchor, loading or unloading cargo, laid-up etc.

### Troškovi goriva

Troškovi goriva (*fuelling*,  $C_G$ ) – čine ih troškovi nabave i opskrbe broda gorivom i mazivom potrebni za rad glavnog i pomoćnih brodskih motora. Ti troškovi promjenjiva su veličina koja svoje vrijednosti poprima ovisno o trenutnom položaju broda na putovanju. Uobičajene stavke koje čine troškove goriva i maziva jesu pojedinačni troškovi ( $c_{Gj}$ ): (1) troškovi pogonskog goriva (teško gorivo), (2) troškovi dizelskog goriva (lako gorivo), (3) troškovi ulja, (4) troškovi masti, ... (m) drugi troškovi goriva i maziva

$$C_G = \sum_{j=1}^m c_{Gj}. \quad (5)$$

Hrapavost i oblik trupa, gaz i trim broda, priprema porivnog stroja i goriva, gospodarenje generatorima i električnom energijom te izbor optimalnog plovidbenog pravca utječu na smanjivanje troškova goriva i brzinu plovidbe.

### 3. TROŠAK UPRAVLJANJA KVALITETOM

S ciljem povećanja razine kvalitete<sup>4</sup> upravljanja brodovima s aspekta sigurnosti te eliminiranja podstandardnih brodova s tržišta broskog prostora, međunarodne pomorske organizacije<sup>5</sup> propisale su čitav niz standarda<sup>6</sup> koji se odnose na brodove i kompanije koje tim brodovima upravljaju. Valja napomenuti da ti standardi predstavljaju niz mjera i pravila koje brodar treba zadovoljiti kako bi dokazao da je sigurno upravljanje brodom sastavni dio njegovog sustava. Naime, jedan od postavljenih ciljeva jest promatranje broda i kompanije koja upravlja tim brodom kao jedinstvene cjeline, a ne kao dva odvojena sustava. Međunarodne pomorske organizacije odredile su i pravila o inspekcijskom nadzoru provedbe tih standarda te ovlaštena tijela koja te inspekcije mogu provoditi. Organizacije koje mogu vršiti takav inspekcijski nadzor potpisnice<sup>7</sup> su dokumenta pod nazivom *Memorandum of Understanding on Port State Control*. Osim tih

<sup>4</sup> Prema ISO 9001:2008, kvaliteta je stupanj do kojeg skup svojstvenih karakteristika ispunjava određene zahtjeve.

<sup>5</sup> *International Maritime Organization* (IMO).

<sup>6</sup> Npr. *International Safety Management (ISM) Code*, zahtjevi registra, zahtjevi državnih pomorskih organizacija.

<sup>7</sup> Npr. *Port State Control (PSC)*, *United States Coast Guard (USCG)*, *Tokyo MOU* itd.

(3) lubricant costs, (4) grease costs, ... (m) other fuelling costs.

$$C_G = \sum_{j=1}^m c_{Gj}. \quad (5)$$

Roughness and the shape of the hull, draft and vessel trim, preparation of the propelling engine and fuel, optimal use of generators and electric power as well as the choice of the optimal navigational route and the sailing speed may decrease fuelling costs.

### 3. QUALITY MANAGEMENT COSTS

In order to increase the quality level of vessel safety management<sup>4</sup> and to eliminate substandard vessels from the vessel market the International Maritime Organization<sup>5</sup> has set numerous standards<sup>6</sup> referring to vessels and vessel management companies. It is important to say that those standards consist of a number of regulations and requirements that an operator has to meet in order to prove that safe vessel management is included in their system. In fact, one of the set goals is to perceive a vessel and the company that manages it as a single entity, not as two separate systems. The International Maritime Organization has also brought in regulations regarding inspection control of compliance with those standards and authorized certain organizations to carry out the inspection. The organizations that are authorized to carry out such inspection are the signatories<sup>7</sup> to the Memorandum Of Understanding On Port State Control. There are also other bodies and organizations that can carry out such inspection control such as Port State Maritime Administration or interested private parties (such as vetting inspections, RightShip etc.), but their standards are exclusively determined by their own regulations and they are not taken into consideration in this paper.

<sup>4</sup> According to ISO 9001:2008, quality is degree to which a set of inherent characteristics fulfills requirements.

<sup>5</sup> *International Maritime Organization* (IMO).

<sup>6</sup> For instance *International Safety Management (ISM) Code*, Register requirements, requirements of state maritime organizations.

<sup>7</sup> For instance *Port State Control (PSC)*, *United States Coast Guard (USCG)*, *Tokyo MOU* etc.

organizacija inspeksijske nadzore mogu vršiti i druga tijela, odnosno organizacije poput pomorskih vlasti države zastave ili privatnih zainteresiranih strana (npr. vetinzi), no njihovi standardi vezani su isključivo za njihove propise i nisu uzeti u obzir u ovome radu.

Primjena tih sve strožih<sup>8</sup> standarda vezanih za upravljanje sigurnošću i kvalitetom na brodovima iziskuje i veći trošak za brodaru.

Poznavanje troškova upravljanja kvalitetom po putovanju broda od velikog je značaja za uspješnost izvedbe samog putovanja sa stajališta ekonomske isplativosti. Troškovi upravljanja kvalitetom definiraju se kao troškovi koji su u pravilu nastali zbog uvođenja sustava kvalitete, tj. troškovi koji su nastali poradi uvođenja određenih postupaka i mjera s ciljem sprječavanja nepravilnosti, troškovi koji su nastali planskom provjerom sustava upravljanja kvalitetom, kao i troškovi uklanjanja nepravilnosti, odnosno nesukladnosti (engl. *deficiency*) utvrđenih internim ili eksternim provjerama sustava.

Troškove upravljanja kvalitetom u OLKB-u možemo podijeliti na:

- troškove sustava upravljanja i unapređenja kvalitete ( $C_q$ ) i
- troškove uklanjanja nesukladnosti ( $C_{DEF}$ ).

#### **Troškovi sustava upravljanja i unapređenja kvalitete ( $C_q$ )**

Njih čini ukupan iznos koji je potrebno uložiti u proces poslovanja kako bi se osigurala kvalitetno pružena usluga.

Valja napomenuti da su brodari u pravilu i do sada ulagali sredstva s ciljem povećanja sigurnosti na brodovima, no primjenom novih pravila oni su sada na to primorani. Naime, u slučaju da se nadzorom provjere primjene standarda ustanovi nepridržavanje propisanih pravila od strane brodaru, ovlašteno inspeksijsko tijelo brodaru može izreći mjere koje mogu biti u rasponu od opomena do zabrana isplovljenja brodarevog broda, odnosno trajnog izгона njegovog broda iz određenih područja. Uobičajeni troškovi koji ulaze u troškove sustava upravljanja i unapređivanja kvalitete jesu sljedeći ( $c_q$ ): (1) troškovi uvođenja sustava kvalitete, (2) troškovi implementiranja sustava upravljanja kvalitetom, (3) troškovi prosudbi, odnosno provjera,

Application of increasingly stringent<sup>8</sup> standards regarding safety and quality management on board a vessel incurs higher costs on the operator.

It is essential to be well acquainted with the costs of quality management on a voyage in order to have a successful voyage from the point of profitability. Quality management costs are defined as costs incurred by the introduction of a quality management system, i.e. costs incurred by the introduction of certain procedures and measures in order to prevent deficiencies, costs incurred by planned quality management system control as well as costs of remedying deficiencies identified by internal or external system inspections.

Quality management costs in coastal container liner shipping can be divided into the following:

- Quality management and improvement system costs ( $C_q$ ) and
- Deficiency remedy costs ( $C_{DEF}$ ).

#### **Quality Management and Improvement System Costs ( $C_q$ )**

These costs consist of the total amount which has to be invested in the business process in order to ensure high quality services.

It is important to say that shipping operators have always been investing resources in order to increase safety on board, but now with the application of the new regulations they are compelled to do it. In fact, in case the operator's lack of compliance with the regulations and standards is detected during an inspection control, the inspection authority/body can impose measures ranging from a warning to vessel detention or permanent ban of the operator's vessel from certain areas. Quality management and improvement system costs usually include the following costs ( $c_q$ ): (1) costs of introduction of a quality management system, (2) costs of implementation of a quality management system, (3) Audit or inspection costs, (4) quality improvement costs, (5) costs of implementation of standard modifications ... (p) other costs incurred by the quality management system.

<sup>8</sup> Npr. *Paris MOU New Inspection Regime*.

<sup>8</sup> For example *MOU New Inspection Regime*.

(4) troškovi unapređenja kvalitete, (5) troškovi implementacije izmjena postojećih standarda...  
(p) drugi materijalni troškovi koji su proizašli iz sustava upravljanja kvalitetom

$$C_q = \sum_{j=1}^p c_{pj} \quad (6)$$

Troškovi uvođenja sustava kvalitete jesu svi oni troškovi koji su vezani za proces uvođenja sustava, a koji su nastali od trenutka kada je donesena odluka o uvođenju sustava ili nastupa obaveze uvođenja sustava do trenutka kada sustav počinje biti u funkciji. To su u pravilu troškovi materijala, edukacije, konzultacija s ekspertima i slično.

Troškovi implementiranja sustava upravljanja kvalitetom podrazumijevaju one troškove koji nastaju zbog povećanog motrenja samog sustava dok se dostigne razina zadovoljstva kvalitetom. To su u pravilu troškovi koji su proizašli iz dodatnih kontrola te edukacije, kako zaposlenih u upravi brodarata tako i pomoraca.

Troškovi prosudbi, odnosno provjera jesu troškovi koji su proizašli iz internih prosudbi (audita) poput putnih troškova, troškova izrade izvještaja i sl.

Troškovi unapređenja kvalitete uključuju troškove poboljšanja sustava koji su proizašli iz prosudbe, a ne uključuju troškove proizašle iz utvrđenih nesukladnosti, odnosno nepridržavanja propisanog standarda. Naime, na samoj prosudbi može se zaključiti kako određene radnje i/ili procedure treba mijenjati ili poboljšavati s ciljem poboljšavanja sustava, iako nije utvrđena sama nesukladnost<sup>9</sup>.

Troškovi implementacije izmjena postojećih standarda jesu troškovi koji proizlaze iz izmjene ili nadopuna samih standarda.

#### Troškovi uklanjanja nesukladnosti ( $C_{DEF}$ )

Uočeni nedostaci na inspeksijskom nadzoru, odnosno nesukladnosti u odnosu na propisana pravila moraju se ukloniti te, nakon što su uklonjeni, mora se dokazati da je novo stanje u skladu s pravilima. Inspeksijsko tijelo određuje do kada se uočena nesukladnost mora ukloniti<sup>10</sup>. U pravilu rokovi za korektivnu radnju ovise o oz-

<sup>9</sup> Npr. izmjena, spajanje ili ukidanje određenih procedura ili listi provjera.

<sup>10</sup> Npr. *PSC Action Codes*

$$C_q = \sum_{j=1}^p c_{pj} \quad (6)$$

Costs of introduction of a quality management system include all the costs related to the process of introduction of the system which were incurred from the moment when the decision was made to introduce the system or when the obligation to introduce the system was imposed to the moment when the system is operational. These costs usually include costs of materials, education, expert consulting etc.

Costs of implementation of a quality management system include the costs incurred by increased surveillance of the system until a satisfactory quality level of the system is achieved. These are usually costs incurred by additional controls and education of both the staff and the seafarers.

Audit or inspection costs are the costs incurred by internal audits such as travel expenses, costs of preparing reports etc.

Quality improvement costs include system improvement costs incurred by audit or inspection, but they do not include the costs incurred by identified deficiencies or lack of compliance with the mandatory standards. In fact, during the audit a conclusion may be drawn that certain actions and/or procedures have to be modified or improved in order to improve the system, although no deficiency has been identified<sup>9</sup>.

Costs of implementation of standard modifications are the costs incurred by standard modification or by supplements to standards.

#### Deficiency Remedy Costs ( $C_{DEF}$ )

Deficiencies identified during an audit or inspection, or a lack of compliance with the regulations have to be remedied and, after they have been remedied, it has to be proved that the new state is in compliance with the regulations. An inspection body sets a deadline by which the deficiency has to be rectified<sup>10</sup>. As a rule, a deadline for corrective actions depends on the severity of the identified deficiency and it is usually the following:

<sup>9</sup> For example modification, integration or elimination of certain procedures or check lists.

<sup>10</sup> For example *PSC Action Codes*



biljnosti uočene nesukladnosti i najčešće su sljedeći:

- do isplovljenja broda (na zadovoljstvo inspeksijskog tijela, brodskog registra ili pomorske administracije čiju zastavu brod vije)
- do dolaska u sljedeću luku
- neko drugo razdoblje ili
- tijekom sljedećeg planiranog boravka broda u remontnom brodogradilištu.

Bez obzira na vrijeme potrebno za uklanjanje nesukladnosti ili na ozbiljnost same nesukladnosti, brodar za njeno uklanjanje mora uložiti ili izdvojiti određena materijalna sredstva ili koristiti ljudske resurse.

Trošak uklanjanja nesukladnosti ( $C_{DEF}$ ), odnosno dostizanja kvalitete u sustavu OLKB-a prvenstveno se iskazuje povećanim, u pravilu neplaniranim, troškovima ( $c_{DEFr}$ ) u koje ulaze: (1) trošak materijala i opreme, (2) trošak ljudi, (3) trošak ovlaštenih tijela ili institucija, (4) trošak dodatno utrošenog..., (r) drugi materijalni troškovi koji su proizašli iz postupaka uklanjanja nesukladnosti

$$C_{DEF} = \sum_{j=1}^r c_{DEFr} \quad (7)$$

Trošak materijala i opreme jest kupnja, dostava, ugradnja ili popravak određenih dijelova za koje je tijekom prosudbe zaključeno da ne odgovaraju postavljenim standardima. To se u prvom redu odnosi na raznu sigurnosnu opremu na brodu poput sredstava za napuštanje broda (čamci, splavi i brodski siz), protupožarnu opremu, opremu za spašavanje i slično. Također, u ove troškove spadaju i troškovi usluga raznih ovlaštenih servisa i radionica.

Trošak ljudi uključuje naknade predstavnika kompanije (inspektora, DPA-a itd.), vanjskih savjetnika i eksperata te druge troškove (putne troškove, troškove smještaja, dnevnice, terenske dodatke i slično).

Trošak ovlaštenih tijela ili institucija uključuje troškove proizašle iz ponovnog dolaska zaduženih inspektora radi ponovne inspekcije, mogućih dolazaka predstavnika drugih institucija kao što su predstavnici države zastave broda, predstavnici registra broda, predstavnici P&I kluba i slično, ovisno o utvrđenim nesukladnostima. Također, u ove troškove spada i korište-

- until the vessel sets sail (to the satisfaction of the inspection body, shipping register or flag administration),
- until the arrival at the next port of call,
- another period of time or
- during the next planned stay in dry dock.

Regardless of the time required for deficiency remedy and regardless of its severity, the operator has to invest or use certain financial or human resources for its remedy.

The costs of deficiency remedy ( $C_{DEF}$ ) or costs of raising the quality to the satisfactory level in coastal container liner shipping are usually presented as increased, usually unplanned costs ( $c_{DEF}$ ) which include the following: (1) costs of materials and equipment, (2) staff costs, (3) costs of competent authorities or institutions (4) additional time costs ... (r) other costs incurred by the deficiency remedy procedures.

$$C_{DEF} = \sum_{j=1}^r c_{DEFr} \quad (7)$$

Costs of materials and equipment include purchase, delivery, installation or repair of certain spare parts which have been identified as not meeting the set standards during an audit/ or inspection. This primarily refers to various safety equipment on board such as survival craft in case of vessel abandonment (lifeboats, rafts and gangway), fire fighting equipment, life saving equipment etc. These costs also include the costs of services performed by authorized workshops.

Staff costs include the company representatives' wages (Inspectors, DPAs etc.), external advisers' and experts' fees, and other costs (travel expenses, accommodation costs, daily allowances, field allowances etc.).

Costs of competent authorities or institutions include costs incurred by reinspections, possible visits by representatives of other institutions such as Port State Control, Shipping Register, P&I Club etc. depending on the deficiencies that have been identified. These costs also include additional education costs such as fire drill etc.

Additional time costs include all the costs incurred by unplanned additional stay of the ves-

nje usluga dodatnih edukacija kao što su vatrogasne vježbe i slično.

Trošak dodatno utrošenog vremena uključuje sve one troškove koji su proizašli iz nepredviđenog dodatnog zadržavanja broda u luci ili na terminalu izvan komercijalnih potreba broda uključujući i izgublenu dobit te neizravne troškove. Naime, u slučaju da je brod zaključen na vrijeme<sup>11</sup>, tijekom toga dodatnog vremena prekida se vrijeme brodskog najma (brod je *off hire*). Za to razdoblje brod također ima redovite lučke nekomercijalne troškove poput troška upotrebe obale, troškova agenta i sl. Također potrebno je spomenuti i neizravne troškove, odnosno one troškove koji su proizašli zbog zaštoja u obavljanju brodske linije.

Prema navedenom, troškove upravljanja kvalitetom u OLKB-u možemo izraziti na sljedeći način:

$$C_Q = C_q + C_{DEF} \text{ [novčane jedinice]}, \quad (8)$$

gdje je:

$C_Q$  – trošak upravljanja kvalitetom u OLKB-u

$C_q$  – troškovi sustava upravljanja i unapređenja kvalitete

$C_{DEFK}$  – trošak uklanjanja nesukladnosti.

Ovako navedena obilježja određuju troškove kvalitete kao mjerljivu veličinu koja stavlja u odnos sredstva utrošena za osiguranje kvalitete sa sredstvima potrebnim za ispravljanje utvrđenih nedostataka. Drugim riječima, pretpostavka je da bi povećano ulaganje u sustav upravljanja kvalitetom dovelo do smanjenja pojave nepravilnosti. Međutim, praksa pokazuje da pojedini brodari često smatraju kako ulaganje u sustav upravljanja kvalitetom treba biti što manje, a da se pri tome zadovolje minimalni uvjeti postavljenih standarda. Ipak, takva razina ulaganja umanjuje mogućnost pronalaska nesukladnosti. Stoga je prihvatljivije trošak kvalitete promatrati kao sumu troškova uloženi u sustav upravljanja kvalitetom i troškova uklanjanja nesukladnosti.

U skladu s gore navedenim, upravljanje kvalitetom kontinuirani je proces koji se sastoji od uvođenja, implementiranja, prosudbe i korektivnih radnji.

sel in port or at a terminal off-hire, including the lost profit and indirect costs. In fact, in case the vessel is hired under a Time Charter<sup>11</sup> the additional time is the period of time when the vessel is off-hire. During that period there are also regular non-commercial port costs such as key dues, agent fees etc. In addition, there are also indirect costs, i.e. the costs incurred by a delay in performing a shipping service.

Accordingly, quality management costs in coastal container liner shipping can be expressed in the following way:

$$C_Q = C_q + C_{DEF} \text{ [monetary units]}, \quad (8)$$

where:

$C_Q$  – quality management costs in CCLS

$C_q$  – quality management and improvement system costs

$C_{DEFK}$  – deficiency remedy costs

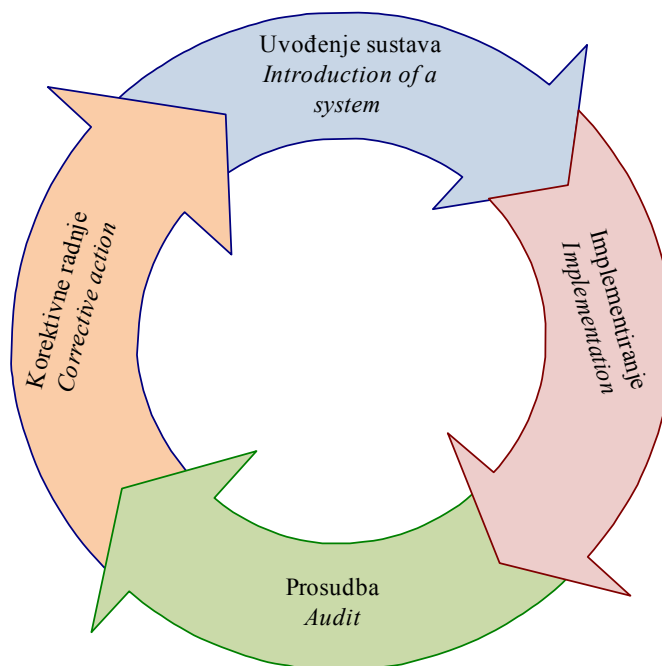
As presented above, quality management costs are a measurable unit which incorporates quality management and improvement system costs and deficiency remedy costs. In other words, it can be assumed that increased investing in a quality management system would decrease the likelihood of occurrence of deficiencies. However, in practice, some operators often assume that investing in a quality management system should be as modest as possible, just enough to meet the minimum requirements of set standards. However, such modest investment decreases the likelihood of identifying deficiencies. Therefore, it is more acceptable to consider quality management costs as the sum of the costs invested in the quality management system and deficiency remedy costs.

Accordingly, quality management is a continuous process consisting of introduction, implementation, auditing and corrective actions.

A conclusion can be drawn that quality costs include all the costs which are necessary for introduction and implementation of a quality management system, costs incurred by remedying or eliminating deficiencies or any incompliance with the set standards as well as costs of prevention of their reoccurrence. It should be pointed out that quality management costs are planned annually. In fact, monitoring of quality

<sup>11</sup> Time Charter

<sup>11</sup> Time Charter



Slika 2. Upravljanje kvalitetom  
Figure 2. Quality management

Izvor: Autor  
Source: Author

Može se zaključiti da troškovi kvalitete predstavljaju sve one izdatke potrebne za uvođenje i implementiranje sustava upravljanja kvalitetom te troškove nastale ispravljanjem, odnosno uklanjanjem nastalih pogrešaka ili nesukladnosti kao izdatke za sprječavanje njihova ponovnog nastanka.

Treba naglasiti da se troškovi upravljanja kvalitetom planiraju na godišnjoj razini. Naime, praćenje troškova upravljanja kvalitetom te njihovo pribrajanje drugim troškovima putovanja prema njihovom stvarnom nastanku ne bi davali realnu sliku poslovanja. Stoga se godišnja vrijednost dijeli na broj dana (poput fiksnog troška).

#### 4. UPRAVLJANJE TROŠKOVIMA U OLKB-u

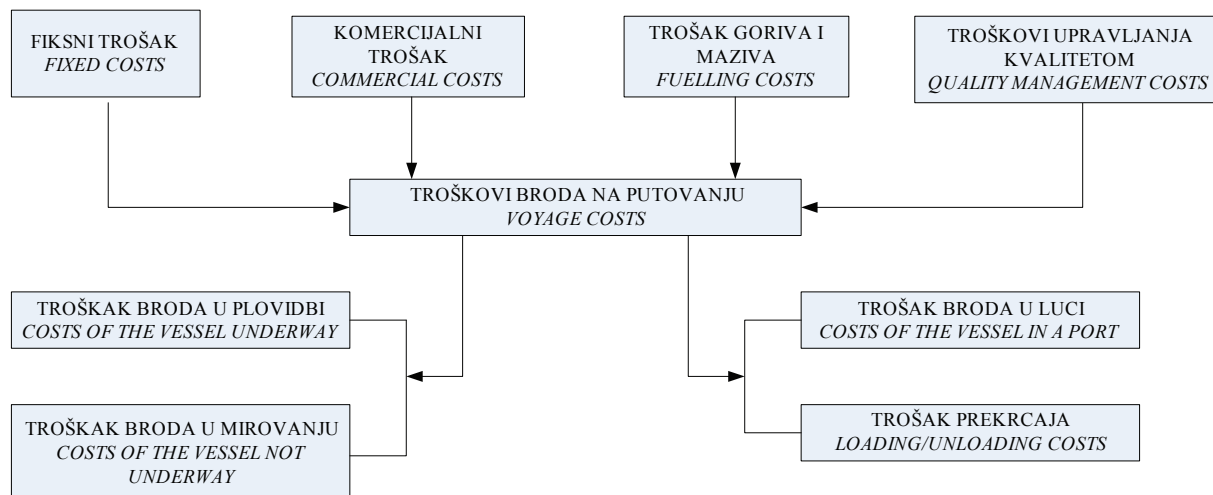
Upravljanje troškovima može se definirati i kao način dostizanja cilja poslovanja temeljen na kontroli troškova. Upravljanje troškovima ne znači nužno smanjivanje vrijednosti troškova, već je to način upravljanja troškovima broda koji najveću važnost u postizanju poslovnih ciljeva poklanja optimizaciji troškova.

management costs and adding them to other voyage costs as they were incurred does not give the accurate picture of business performance. Therefore, the annual amount of quality management costs has to be divided by the number of days in a year (like fixed costs).

#### 4. COST MANAGEMENT IN CCLS

Cost management can be defined as a way to achieve business goals paying special attention to cost control. Cost management does not necessarily mean decreasing the amount of the costs. In fact, it is a way of vessel cost management which pays close attention to cost optimization in achieving business goals.

In order to have efficient cost management in coastal container liner shipping the operator has to adopt a series of measures and activities to affect the amount of costs without deteriorating business performance. In addition, the shipping operator has to decide which type of vessel to choose to perform container transport with optimal costs taking into consideration technical characteristics of the vessel (speed, capacity, shape etc.).



Slika 3. Struktura troškova putovanja  
Figure 3. Voyage costs

Izvor: Autor  
Source: Author

Upravljanje troškovima u linijskom kontejnerskom brodarstvu podrazumijeva napore broдача da nizom mjera i aktivnosti utječe na veličinu troškova, a da pri tome ne naruši temeljne funkcije poslovanja. Broдар donosi odluku o izboru broда koji će svojim tehnološkim karakteristikama (brzinom, kapacitetom, oblikom, ...) zadovoljiti potrebe prijevoza kontejnera uz optimalne troškove.

Priložena shema (slika 3) prikazuje modificirani troškovni model kontejnerskih brođova koji se sastoji iz sljedećih troškova.

Iz priložene slike 3 vidljivo je da je moguće pratiti osnovne skupine troškova:

- troškovi vezani uz brod i plovidbu broда
- troškovi boravka broда u luci
- troškovi tehnologije prijevoza i prekrcaja i
- troškovi sustava upravljanja kvalitetom.

Da bi se mogao očekivati bilo kakav pozitivan rezultat procesa upravljanja troškovima obalnog linijskog kontejnerskog brođara, potrebno je detaljno poznavati postojeću strukturu ukupnih troškova, što bi trebao biti prvi korak u svakom promišljanju o upravljanju troškovima u linijskom kontejnerskom prijevozu. U broдарskom poduzeću pristup troškovima ovisi o razini upravljanja. U pravilu tri osnovne razine jesu operativna, komercijalna i strateška.

The scheme 3 shows a modified container vessel cost model consisting of the following costs.

The figure 3 shows that it is possible to monitor the main types of cost, as follows:

- those related to the vessel underway,
- those related to the vessel's stay in port,
- those related to the loading/unloading technology, and
- those related to quality management system.

In order to expect any positive results of the cost management process in coastal container shipping it is important to be well acquainted with the types of current costs. That should be the first step when considering to introduce cost management in coastal container liner shipping. The approach to costs in a shipping company depends on the management level. As a rule, there are three management levels, as follows: operational, commercial and strategic management level.

Operational level management observes and analyzes every cost within a voyage in order to reduce it.

Commercial level management observes and analyzes voyage costs on a daily basis as well as average costs over a longer period of time taking into consideration the average costs and technological characteristics of a vessel, cargo being transported, number of ports called etc.

Operativna razina promatra i analizira svaki trošak unutar jednog putovanja s ciljem njegovog smanjenja.

Komercijalna razina promatra i analizira troškove putovanja u njihovoj dnevnoj i prosječnoj vrijednosti u dužem razdoblju koristeći prosjeke troškova prema tehnološkim karakteristikama brodova, prema povezenom teretu, prema broju luka ticanja itd.

Strateška razina, odnosno menadžment brodarka upravlja troškovima isključivo po pitanju profitabilnosti poslovanja broda tijekom cijelog održavanja linije tim brodom.

Ukupni troškovi broda na putovanju ne bi smjeli biti veći od ukupnih prihoda broda ( $F_{PUT}$ ) koji plovi na nekoj brodskoj liniji. Vrijednosti tih troškova u pravilu nisu ograničene stvarnim potrebama broda, već su ograničene prihodima, odnosno tržištem potražnje za brodskim prostorom. Jasno je kako uprava brodarka ne smije dozvoliti financijske gubitke broda na liniji<sup>12</sup>, odnosno održavanja linije, no isto tako ne smije dozvoliti zaustavljanje broda zbog ustanovljenih nedostataka utvrđenih na inspekcijском nadzoru.

Primjena novih standarda sigurnosti i upravljanja kvalitetom na brodovima prije svega dovodi do nove razine troškova upravljanja brodom. Osim što dovodi do nove razine troškova, mijenja i dosadašnju strukturu troškova putovanja. Prema tome, troškove putovanja broda možemo izraziti na sljedeći način:

$$C_{PUT} = C_F + COM_C + C_G + C_Q \text{ [novčane jed.], (9)}$$

gdje je:

$C_{PUT}$  – trošak putovanja

$C_F$  – fiksni trošak broda

$C_G$  – trošak goriva i maziva

$C_Q$  – trošak kvalitete

$COM_C$  – komercijalni trošak.

Dozvoljena razina troškova putovanja broda u funkciji je ostvarene vozarine na putovanju, odnosno

$$C_{PUT} \leq F_{PUT}. \quad (10)$$

<sup>12</sup> Zbog odnosa prema vlasnicima broda, dioničarima brodarka i sl.

Strategic level management i.e. the shipping operator's Board of Directors manages costs by taking into consideration business profitability over the whole period in which the shipping line is operational.

Total costs of a vessel on a voyage should not exceed total revenue of a vessel ( $F_{PUT}$ ) performing shipping service on a shipping line. As a rule, the amount of those costs is not limited by real needs of the vessel, but by the revenue from the vessel's operation or by the demand on the market. Clearly, the operator's Board of Directors cannot allow the vessel to operate with financial loss<sup>12</sup> or to have financial loss in order to keep the shipping line operational. However, they cannot allow to have the vessel detained due to deficiencies identified during an inspection.

Application of new safety standards and quality management on board vessels incurs new costs in vessel management and changes the structure of voyage costs. Consequently, voyage costs can be expressed in the following way:

$$C_{PUT} = C_F + COM_C + C_G + C_Q \text{ [monetary units], (9)}$$

Where:

$C_{PUT}$  – voyage costs,

$C_F$  – fixed costs of the vessel,

$C_G$  – fuelling costs

$C_Q$  – quality management costs

$COM_C$  – commercial costs

The allowed amount of costs on a voyage is limited by the freight charged for the voyage, as follows:

$$C_{PUT} \leq F_{PUT}. \quad (10)$$

As in coastal liner shipping costs and revenue are observed over a longer period of time, usually quarterly, business decisions depend on the profit, i.e. the positive difference between revenues ( $F$ ) and costs ( $C$ ) in several voyages ( $j$ ) of the vessel on the same shipping line. From that point of view profit ( $B$ ) can be expressed as follows:

$$B = \sum_{j=1}^n f(F_j - C_j). \quad (11)$$

<sup>12</sup> Because of the shipowners, shareholders etc.

Kako se u poslovanju linijskog broдача troškovi i prihodi promatraju u duljem razdoblju, najčešće kvartalno, poslovne odluke u funkciji su i dobiti, odnosno pozitivne razlike između prihoda (F) i troškova (C) tijekom više putovanja (j) na kojima brod plovi na toj liniji. S takvog aspekta dobit (B) promatra se kao:

$$B = \sum_{j=1}^n f(F_j - C_j). \quad (11)$$

Nakon provedene analize većeg broja putovanja (j) može se vidjeti utjecaj novih troškova na poslovanje broda na određenoj liniji. Stoga, primjena novih standarda kvalitete zahtijeva od uprave broдача donošenje jedne od sljedećih poslovnih odluka:

- smanjenje postojeće razine troškova uz zadržavanje jednake razine prihoda
- smanjenje postojeće razine troškova uz smanjenje razine prihoda
- smanjenje postojeće razine troškova i prihoda
- povećanje postojeće razine troškova i prihoda.

Naime, važno je naglasiti da se u pravilu pogrešno smatra kako troškovi upravljanja kvalitetom spadaju u fiksne troškove broda budući oni ne ovise o intenzitetu prometne usluge. U tom slučaju uprava broдача može odlučiti da se vrijednost fiksnih troškova broda treba zadržati na dosadašnjoj razini bez obzira na objektivni nastanak novih troškova.

Prilikom određivanja strategije brodarskog poduzeća nije moguće predvidjeti sve troškove koji se pojavljuju na putovanju broda. Ciljevi poduzeća dugoročno se zacrtavaju strategijom na temelju stručnih procjena i predviđanja budućeg stanja na tržištu. Promjena strategije nastupa onda kada se ispostavi da je bila pogrešna ili kada su na tržištu nastupili takvi uvjeti koji postojeću strategiju čine neuspješnom.

Iz tog razloga odluka o uspostavljanju sustava uvođenja kvalitete u OLKB-u te razina sredstava koja će se uložiti u takav sustav predstavlja odluku strateške razine. Naime, provođenje takve odluke zasigurno ima dugoročne posljedice za poslovanje OLKB-a bez obzira imaju li te posljedice pozitivan ili negativan predznak.

Troškovi kvalitete čine sintezu preventive i kurative, koje se mogu analizirati kroz četiri osnovne kategorije, a to su: troškovi preventive,

After a large number of voyages (j) are analyzed, the influence of the new costs on the vessel operation on a certain line can be visualized. For that reason the application of new quality standards and regulations requires from the operator's Board of Directors to make one of the following business decisions:

- to reduce the current amount of costs and keep the same amount of revenue,
- to reduce the current amount of costs and reduce the amount of revenue,
- to increase the current amount of both costs and revenue.

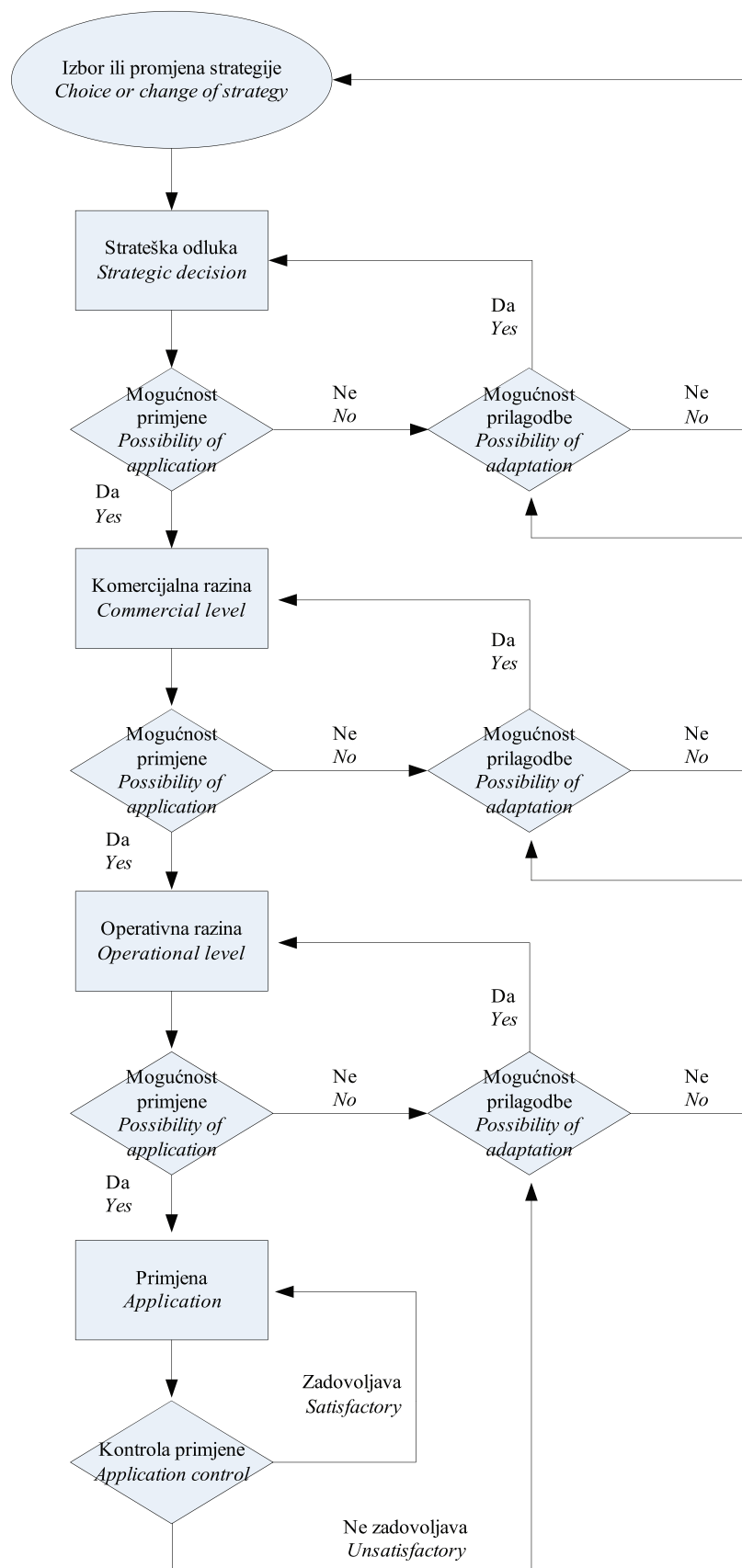
In fact, it is important to point out that it is usually wrongly assumed that quality management costs are part of fixed costs of a vessel because they do not depend on the intensity of the shipping service. In that case the operator's Board of Directors can decide to keep the amount of fixed costs of the vessel unchanged regardless of the actual incurrence of new costs.

When drawing up the strategy of a shipping company it is impossible to predict all the costs that will be incurred during a voyage. Business goals of a shipping company are set in long-term strategic plans based on expert assessment and prediction of the state of the market. The strategy has to be changed when it is clear that it has been wrong or when the new conditions on the market are making it unsuccessful.

For that reason the decision to introduce a quality management system in coastal container liner shipping and the decision on the amount that will be invested in such a system is a strategic decision. In fact, carrying out such decisions has long-term consequences for coastal container liner shipping operation regardless of whether those consequences are adverse or beneficial.

Quality management costs are a synthesis of prevention and remedy and they can be analyzed in four basic categories as follows: prevention costs, assessment costs, costs of internal loss, and costs of external loss. The importance of quality management costs lies in the fact that with a good quality management system resources can be put to much better use than without one, which directly affects competitiveness of the shipping operator.

It is important to use financial indicators to measure the efficiency of the quality manage-



Slika 4. Razine upravljanja troškovima  
Figure 4. Cost management levels

Izvor: Autor  
Source: Author

troškovi ocjenjivanja, troškovi unutarnjih gubitaka i troškovi vanjskih gubitaka. Značaj troškova kvalitete proizlazi iz činjenice da se sve ono što se potroši za izradu neupotrebljivih učinaka može iskoristiti za izradu upotrebljivih učinaka ili za poboljšanje postojećih, čime se neposredno utječe na povećanje konkurentnosti.

Važno je učinkovitost sustava upravljanja i unapređenja kvalitete mjeriti financijskim pokazateljima. Tako se troškovi kvalitete mogu izraziti (Juran, 1999): “kao postotak po završenom putovanju, u usporedbi s profitom, po jednoj emitiranoj običnoj dionici, kao postotak ukupnih troškova prijevoza i prekrcaja, kao utjecaj troškova kvalitete na prag rentabilnosti”.

Upravljanje troškovima u uskoj je svezi s pojmom uspješnog putovanja kao mjerila ekonomičnosti poslovanja obalnog linijskog kontejnerskog broдача. Stoga valja razmotriti što podrazumijeva pojam uspješnog poslovanja. Sa stanovišta broдача uspješno putovanje jest ono:

- koje je ostvarilo veću vozarinu od troška
- koje je završeno u vremenu predviđenog putovanja
- koje je završeno bez šteta na brodu i teretu
- u kojem je na vrijeme ukrčan i iskrčan sav zaključeni teret
- u kojem su zadovoljeni svi zahtjevi kvalitete i
- nakon kojeg je brod spreman za iduće putovanje.

Ocjenu uspješnosti putovanja donosi broдар na temelju navedenih kriterija uspoređujući promatrano putovanje s prethodnim putovanjem, prosjekom prethodnih putovanja ili s planiranim veličinama za uspješno putovanje.

## 5. ZAKLJUČAK

Uvođenje novih pravila upravljanja sigurnošću i kvalitetom na brodovima od strane međunarodnih pomorskih organizacija iziskuje pojačane napore, a time i povećane troškove. Cilj tih novih, sve strožih pravila i standarda jest uklanjanje podstandardnih brodova, odnosno povećanje kvalitete i sigurnosti pomorskog prometa. Troškovi upravljanja kvalitetom postali su značajan čimbenik u strukturi troškova poslovanja broдача. Iz tog razloga nužna je promjena uobičajene podjele troškova broда na fiksne i komercijalne troškove te troškove gori-

ment and improvement system. Thus quality management costs can be expressed in the following ways (Juran, 1999): as a percentage after the voyage is completed, as compared with the profit, as a percentage of the total costs of transport and loading/unloading, or as an influence of the quality management costs on the profitability threshold.

Cost management is closely related to the concept of a successful journey as a measure of business efficiency in coastal container liner shipping. Therefore it is important to see what a successful voyage implies. From the shipping operator's point of view a successful voyage is the following:

- the one in which the freight exceeded the costs,
- the one which was completed within the planned time,
- the one which was completed without any damage to the vessel or to the cargo,
- the one in which all the cargo has been loaded/unloaded on time,
- the one in which all the quality requirements have been met, and
- the one after which the vessel is ready for a new voyage.

The shipping operator makes an assessment of the voyage based on the above criteria comparing the voyage in question with a previous one, with an average voyage or with what was planned for that voyage.

## 5. CONCLUSION

New regulations regarding quality and safety management on board vessels introduced by the International Maritime Organization are rather demanding on the shipping operators and incur additional costs. Those new, increasingly stricter regulations have been introduced in order to remove substandard vessels from the market and to increase the quality and safety of maritime transport. Quality management costs have become an important part of a shipping operator's business costs. For that reason it is important to change the common division of business costs of a vessel into fixed costs, commercial costs and fuelling costs, and add a new category, quality management costs. Qual-



va i maziva, dodavanjem nove kategorije troška, tj. troškova upravljanja kvalitetom. Troškovi upravljanja kvalitetom definiraju se kao troškovi koji su u najvećem dijelu izazvani uvođenjem sustava kvalitete, tj. troškovi koji su izazvani radnjama i mjerama s ciljem sprječavanja nepravilnosti te planskom provjerom sustava upravljanja kvalitetom, kao i troškovi uklanjanja utvrđenih nesukladnosti.

ity management costs are defined as costs which have mostly been incurred by the introduction of a quality management system, i.e. costs incurred by certain actions and measures in order to prevent occurrence of deficiencies, as well as by planned inspection of the quality management system, and costs of deficiency remedy.

#### LITERATURA / REFERENCES

- [1] International Safety Management (ISM) Code, London, IMO, 2002.
- [2] International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code), Resolution A.714(18), Adopted on 4 November 1993 (Agenda Item 9), London, IMO
- [3] Revised Guidelines on the Implementation of the ISM Code by Administrations and the IMO Resolution A.741(18), London, IMO
- [4] Drljača, M., Mala enciklopedija kvalitete, V. dio – Troškovi kvalitete, Zagreb, Oskar, 2004.
- [5] Rubinić, I., Ekonomika brodarstva, Rijeka, Ekonomski fakultet Sveučilišta u Rijeci, 1976.
- [6] Jelić Mrčelić, G., Terotehnologija, Split, Pomorski fakultet Sveučilišta u Splitu, 2008.
- [7] ISO - ISO 9000 Quality management - ISO 9001:2008, [www.iso.org](http://www.iso.org)
- [8] [www.parismou.org](http://www.parismou.org)
- [9] [www.imo.org](http://www.imo.org)